



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,047	04/26/2001	Yasuo Fukuda	Q64291	6518

7590 01/07/2004

SUGHRUE, MION, ZINN,
MACPEAK & SEAS, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
WASHINGTON, DC 20037-3213

EXAMINER

PHAN, THIEM D

ART UNIT	PAPER NUMBER
----------	--------------

3729

DATE MAILED: 01/07/2004

16

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/842,047

Applicant(s)

FUKUDA ET AL.

Examiner

Tim Phan

Art Unit

3729

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 1-3, 8-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4-7, 25-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The amendment filed in Paper No. 15 (filed 10/21/03) has been fully considered and made of record.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okino et al (US 4,952,272) hereinafter '272.

As applied to claim 4, the '272 teaches a method of manufacturing probe pin for testing, comprising:

- forming an electrode pattern (Cf. Fig. 1, element 2) on a wiring board (Cf. Fig. 1, elements 3 and 1),
- forming a mask pattern (Cf. Fig. 2a, element 9) with dry film resist or photoresist (Cf. column 4, lines 1-2) on an electrode pattern (Cf. Fig. 2b, element 11),

- wet etching (Cf. column 3, lines 21-24) the unmasked portion of the electrode pattern to form pointed bump or acute probe pin (Cf. column 3, lines 26-27) then,
- removing of the mask pattern (Cf. Fig. 2c; column 5, lines 38-40).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to control the wet etching's timing of the unmasked portion of the electrode pattern to form a sharp, very sharp or slightly sharp pointed end since it was known in the art that the critical step of the invention is selective wet etching (Cf. column 3 lines 21-28) over dry film resist on electrode pattern to form probe pin and the probe end pin is shaped to be acute (Cf. column 14, line 1) or sharp pointed.

As applied to claims 5 and 7, the '272 teaches the plating process of the probe pin or projection electrode in order to protect it against any corrosion (Cf. column 3, lines 48-53).

As applied to claim 6, the '272 teaches the wet etching process by an etching solution (Cf. column 5, lines 22-24) for undercut or side or around mask etching (Cf. column 5, line 25).

4. Claims 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of the '272 and vice versa.

As applied to claims 25, 26 and 29, the AAPA teaches the claimed invention, including the formation of electrode pattern on a wiring board of electronic device (Cf. Specification, page

1, lines 12-13).

The '272 teaches a method of manufacturing probing pin by forming a mask pattern (Cf. Fig. 2a, element 9) with dry film resist or photoresist (Cf. column 4, lines 1-2) on an electrode pattern (Cf. Fig. 2b, element 11) for wet etching (Cf. column 3, lines 21-24) to form pointed bump or acute probe pin (Cf. column 3, lines 26-27) then the mask pattern removal (Cf. Fig. 2c; column 5, lines 38-40).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine AAPA with the '272 and to modify the method of AAPA by applying the mask/wet etching as taught by the '272 with some timing control in order to obtain sharp pointed probe of the projection electrode connected to electronic device.

As applied to claim 27, the '272 teaches the plating process of the probe pin or projection electrode in order to protect it against any corrosion (Cf. column 3, lines 48-53).

As applied to claim 28, the '272 teaches the plated film on the projection electrode or probe pin is formed of gold or rhodium to improve electric contact characteristics (Cf. column 8, lines 2-5).

As applied to claim 30, the '272 teaches the claimed invention except for making the bump electrodes in parallel.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to create the bump electrodes in parallel since it was known in the art that the accurate pinning position of the end bump probes can be highly realized on the head probe (Cf. Abstract).

5. Claim 31-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of the '272 and vice versa.

As applied to claims 31, 32, 34 and 35, the AAPA teaches the claimed invention, including the formation of electrode pattern on a wiring board of electronic device (Cf. Specification, page 1, lines 12-13).

The '272 teaches a method of manufacturing probing pin by forming a mask pattern (Cf. Fig. 2a, element 9) with dry film resist or photoresist (Cf. column 4, lines 1-2) on an electrode pattern (Cf. Fig. 2b, element 11) in a polygon or triangle or star shape (Cf. column 3, line 68) equally spaced (Cf. Fig. 2c, element 11) for wet etching (Cf. column 3, lines 21-24) to form pointed bump or acute probe pin (Cf. column 3, lines 26-27) then the mask pattern removal (Cf. Fig. 2c; column 5, lines 38-40).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine AAPA with the '272 and to modify the method of AAPA by applying the mask/wet etching as taught by the '272 with some timing control in order to obtain sharp pointed probe in polygon, star or pentagon or the like pattern of the projection electrode connected to electronic device.

As applied to claim 33, the '272 teaches that during etching the resist pattern (Cf. Fig. 4d, element 9) remains in contact with electrode pattern (f. Fig. 4d, element 2)

Response to Arguments

6. Applicants' arguments with respect to claims 4-7 and 25-35 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tim Phan whose telephone number is 703-605-0707. The examiner can normally be reached on Monday - Friday, 9AM - 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter VO can be reached on 703-308-1789. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 3729

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1148.



Tim Phan
Examiner
Art Unit 3729

tp
January 5, 2004



CARL J. ARBES
PRIMARY EXAMINER